

## Acceleration and its Forces Intro: Newton's 2nd Law

GO TO : <http://phet.colorado.edu/en/simulation/forces-and-motion-basics> Click RUN NOW when the simulation opens click the "Acceleration Lab" tab - we used this "forces: motion basics" simulation before in lab 1!

This introduction will help show the relationship between force, mass and acceleration. We are not looking for an equation quite yet but rather a relationship. Mathematically we write relationships using the symbol  $\propto$ . This does not mean two variables are equal but rather shows how they affect one another. Example:

The more money you make the richer you are...

$$\text{money} \propto \text{wealth}$$

The heavier you are, the slower you are...

$$\text{speed} \propto \frac{1}{\text{weight}}$$

### CONSTANT FORCE

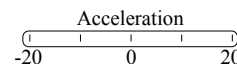
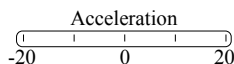
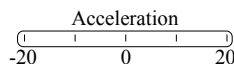
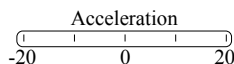
Check all of the boxes so that you can see masses, forces and the acceleration! Turn friction to none.

Drag each figure up to the ice one at a time to push and apply at least a 250 N force. Observe the acceleration meter and color in the corresponding meter appropriately.

Applied Force: \_\_\_\_\_



Mass: \_\_\_\_\_



1. What was your independent variable?

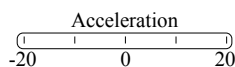
2. What was your dependent variable?

3. How did your dependent variable change in response to your independent? Write a complete explanation here.

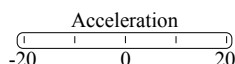
4. Write a mathematical relationship using acceleration and mass. (Not an equation but rather a relationship)

5. If the man holds the fridge and crate, what would you expect the acceleration to be compared to just the man?

Prediction



Actual



6. Does this confirm your relationship?

# PHYSICAL SCIENCE

Name: \_\_\_\_\_

## CONSTANT MASS

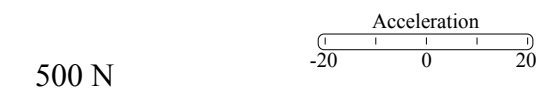
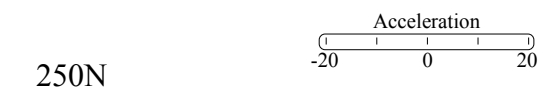
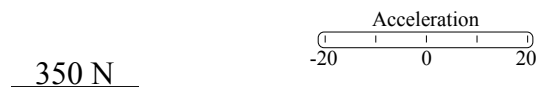
DSHS  
Mrs. Ellis

Repeat the above steps only this time use the only the refrigerator and apply different forces.

Object chosen: Refrigerator

Mass: \_\_\_\_\_

Force applied:



1. What was your independent variable?
2. What was your dependent variable?
3. How did you dependent variable change in response to your independent? Write a complete explanation here.
4. Write a mathematical relationship using acceleration and force. (Not an equation but rather a relationship)

Put your two mathematical relationships together into one relationship.